



# Smile Designing with Ceramic Veneers and Crowns

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## ABSTRACT

Ceramic veneers and all-ceramic crowns can be offered as the treatment option in a wide variety of cases, such as correcting tooth defects, abrasion, malalignment, diastema, tooth discoloration, coronal fracture or to adjust occlusion. Minor changes of shape, shade and position of teeth with ceramic veneers can dramatically alter the appearance of our patients. This paper describes the esthetic rehabilitation and smile designing of three patients presenting with different problems with ceramic veneers and crowns.

**Keywords:** Ceramic veneers, All-ceramic crowns, Smile designing, Dental fluorosis.

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## INTRODUCTION

All-ceramic restorations have gained wide acceptance as a primary mode of restoration in esthetic dentistry.<sup>1</sup> As patients' esthetic expectations continue to increase, dental teams are challenged to identify a systematic approach for achieving natural oral and facial esthetics with ceramics. Advances in ceramic materials and veneering techniques allow practitioners to restore function and esthetics using conservative and biologically sound methods as well as promoting long-term oral health.<sup>2,3</sup>

Conventionally, all-ceramic crowns and veneers were indicated to correct unacceptable or peculiar tooth contour, interdental spacing, gingival recession, malpositioned teeth, mask tooth discoloration or to address minor tooth alignment issues.<sup>4,5</sup> However, the latest trends advocate the correction of minor or severe tooth alignment concerns involving healthy teeth.<sup>6</sup> This refers to the treatment option of correcting minor or even severe malocclusion using restorative procedures.<sup>7,8</sup>

Esthetics, treatment planning and clinical care should be considered in accordance with the interrelationship between the teeth, gingival tissues, lips and face. Consideration as to how the facial and psychological parameters can influence a natural smile design must also be taken into account. Because ceramic veneers and crowns are primarily indicated for the improvement of esthetics, the design of the smile should respect the symmetry and the harmonious arrangement of dentofacial elements.<sup>9,10</sup>

## CASE REPORTS

### Case 1: Dental Fluorosis and Multiple Spaces

A 28-year-old male patient reported with a chief complaint of compromised esthetics due to spacing and discoloration of teeth (Fig. 1A). On clinical examination patient had generalized enamel fluorosis affecting all of the permanent teeth. Confluent pitting was present on most of the surfaces of the teeth with widespread of yellow brown stains. Occlusion was in a class 1 relationship. Oral hygiene was poor with chronic generalized gingivitis swollen anterior marginal gingiva and bleeding on probing (Fig. 1B). Radiographic examination showed no caries or alveolar bone loss. Diagnosis of moderate dental fluorosis was made, based on history, clinical findings and Dean's index.



Fig. 1A: Preoperative extraoral photograph (Case 1)



Fig. 1B: Preoperative intraoral photograph showing moderate fluorosis and deposits (Case 1)

### Treatment Plan

Orthodontic space closure was refused by the patient due to limited time on hands as he was to be married in 3 weeks. Given the age of patient and severity of fluorosis, ceramic veneers were given as treatment option and were accepted by the patient. Ceramic veneers were best suited for the condition. These veneers have the advantage of preserving most of the natural tooth structure while achieving all the cosmetic ends. Six anterior maxillary and six mandibular veneers were suggested but keeping cost factor in mind, patient agreed for six maxillary anterior veneers and four mandibular veneers.

The initial phase of treatment started with thorough full mouth scaling and polishing and laser gum contouring followed by a 10-day gap to allow the gingiva to resume normal health. This was followed by smile analysis, preliminary shade selection, photographs and study models to evaluate the occlusion.

Next clinical appointment following silicone index and APT preparation, final tooth preparation for ceramic veneers was performed, followed by final shade selection and final rubber base impression. The teeth were desensitized and

temporization done. Ceramic veneers were fabricated using pressable ceramic system (pressed ceramic veneers IPS e-Max; Ivoclar Vivadent). The correct fit of veneers was verified both individually and collectively on the model then on the teeth. The patient was satisfied with the form, shape, and shade of veneers. Final cementation was done with variolink N Bare (ivoclar vivadent) clear light curing luting composite. The contacts and occlusion were checked. Postoperative photographs (Figs 1C and D) and instructions concerning oral hygiene and avoidance of habits causing trauma to veneered teeth were given.

### Case 2: Discolored, Decayed and Root Canal Treated Teeth

A 60-year-old male patient complained about discolored upper and lower front teeth and bulky, ill-matching lower anterior metal-ceramic crowns (Fig. 2A). During clinical evaluation, it was observed that there were multiple stained composite restorations on 11, 12, 13, 21, 22, 23, 32, 33, 42 and 43 on all surfaces and acrylic crowns on 31 and 41 with history of root canal treatment. Radiographic examination showed periapical radiolucency in relation to 22, 31, 41 and 42.



Fig. 1C: Postoperative intraoral photograph with ceramic veneers (Case 1)



Fig. 2A: Preoperative intraoral photograph showing stained teeth (Case 2)



Fig. 1D: Postoperative extraoral photograph (Case 1)



Fig. 2B: Postoperative intraoral photograph with ceramic crowns (Case 2)



Fig. 2C: Postoperative extraoral photograph (Case 2)

### Treatment Plan

The presence of multiple discolored restorations circumferentially and previous lower crowns limited esthetic resolution using direct and conservative techniques, such as dental bleaching and restoration with composite or ceramic veneers. Therefore, all-ceramic crowns for all upper and lower incisors and direct composite restorations for canines were chosen as the best treatment option.

Previous endodontic and restorative treatment of the tooth was found to be inadequate. Therefore, root canal treatment was performed for 22, 31, 41 and 42 and the remnants of the filling material were removed. Full mouth scaling and polishing was done to remove stains. This was followed by smile analysis, preliminary shade selection, photographs and study models to evaluate the occlusion.

Next clinical appointment final tooth preparation for all-ceramic crowns was performed, followed by final shade selection and final rubber base impressions. Temporary lab-made crowns were placed on incisors. Canines were restored with composite resin. All-ceramic crowns were fabricated with 3M Lava Zirconia (3M ESPE). The correct marginal fit of crowns was verified both individually and collectively on the model then on the teeth. The dental midlines were left unmatched, so as not to alter the width of lower incisors. The patient was satisfied with the form, shape and shade of crowns (Fig. 2B). Final cementation was done with Variolink N Bare (ivoclar vivadent) clear light curing luting composite. The contacts and occlusion were checked (Fig. 2C).

### Case 3: Multiple Spaces and Malaligned Teeth

A 30-year-old male patient presented for esthetic treatment of spaces between upper anterior teeth. He wanted space



Fig. 3A: Preoperative intraoral photograph with anterior spacing (Case 3)



Fig. 3B: Postoperative intraoral photograph with ceramic veneers (Case 3)



Fig. 3C: Postoperative extraoral photograph (Case 3)

closure and all his frontal teeth to appear straight without orthodontic treatment. He had undergone direct composite veneers twice previously which had failed to last. He wished for a quick and conservative yet durable treatment option.

Clinical examination revealed the presence of midline diastema and spaces between 11 and 12, rotated 12, uneven incisal edges (Fig. 3A).

The treatment plan included the following objectives: Close the diastema between 11 and 21 and spaces between 11 and 12; align and reduce the inclination of 12 and even out the incisal edges. All of these concerns could be addressed with ceramic veneers.

Following shade selection, record taking, silicone index and APT preparation was done followed by final teeth preparation for veneers and rubber base impressions. Ceramic veneers were fabricated using pressable ceramic system (pressed ceramic veneers IPS e-Max; Ivoclar vivadent) and cemented with variolink N Bare (ivoclar vivadent) clear light curing luting composite (Figs 3B and C).

## DISCUSSION

The first case report discusses about the esthetic management of moderate-to-severe fluorosis patient with ceramic veneers. Fluorosis is endemic in some areas of Southern India as a result of drinking well water with high fluoride content. Bleaching or microabrasion of severely fluorosed teeth is often ineffective or gives transient results,<sup>11,12</sup> while composite resin veneers not only discolor and wear with time, but quite often become chipped or debonded.<sup>13</sup> As glazed ceramic retains its color and is wear resistant and biocompatible<sup>14,15</sup> ceramic veneers can be the restoration of choice for severely fluorosed teeth.<sup>16,17</sup> One of the most important advantages is that they are extremely conservative in terms of tooth structure. Also ceramic veneers offer a predictable and successful restoration with an estimated survival probability of 93.5% over 10 years.<sup>18</sup> This case also highlights the proper planning and management of gingival soft tissues to achieve an esthetic outcome.

The second case report discusses the cosmetic treatment of discolored and root canal treated teeth with multiple stained restorations. The properties of dental ceramic-color stability, mechanical strength, clinical longevity, esthetic appearance and compatibility with periodontal tissues-make this material a good choice for such treatment.<sup>19</sup>

The third case report signifies the importance of smile designing with ceramic veneers over traditional orthodontic treatment especially in adult patients who require simple dental alignment but are not inclined to wearing braces and wish for faster treatment results. These restorative procedures are called as 'instant orthodontics' or 'two appointment orthodontics'.<sup>7,8</sup> Crispin reported that veneers can be used to correct mild-to-severe tooth alignment problems.<sup>20</sup>

## CONCLUSION

The esthetic and restorative applications of dental ceramics have increased and will continue to evolve with time. However, the clinicians should be judicious in responding to the ever inflating esthetic demands of the patients. Like every procedure in dentistry, the success of ceramic veneers and crowns depend upon understanding the principles

involved in their fabrication and application. The success of treatment can be assured, if the dentist follows a defined protocol with each patient to ensure that all factors, such as smile design, margin placement, material and shade selection are considered. Communication between patient, dentist and technician is of utmost importance. It is extremely important to procure an informed consent from the patients before treating such cases. It is also important to discuss the functional and biological implications of his or her choice.

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